

Social Factors in Tracheoesophageal Prosthesis Abandonment: Restoring Every Voice

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OBJECTIVES

To determine the correlation between social determinants of health (SDOH) and tracheoesophageal prosthesis (TEP) abandonment.

INTRODUCTION

- TEP is the gold standard for voice restoration following TL, as it permits louder speech, high rates of intelligibility, and longer phonation time with relatively low effort when compared to alternative methods.
- TEP abandonment, defined as prosthesis removal or failure to use it as a primary speech method, has been seen in 13.1 – 34.8% of patients, with a mean time to abandonment of 303 days post-op.**
- Factors known to be associated with TEP abandonment include dissatisfaction with voice, TEP complications, and low patient motivation.
- Lower rates of TEP use have been reported among safety net hospital patients than in the general population.**

METHODS

- Boston University Medical Center IRB exempt (H-43329)
- Patients with TL between June 2015 to June 2023 identified using the institutional Clinical Data Warehouse, with additional patients seen between January 2020 and June 2024 identified from a speech-language pathologist clinic list
- Chart review performed
- Achieved 88.5% power of detecting a large effect size using a sample size of 41 and 6 covariates.
- All analyses were performed in SPSS Version 29.0.2.0 with an $\alpha = 0.05$ level of significance.

RESULTS

- TL patients were 81.4% (57/70) male, 65.7% (46/70) white, 82.9% (58/70) English-speaking, and predominantly covered by Medicaid (23, 32.9%) or Medicare (28, 40.0%).
- Forty-one patients with TEP included in the multivariate analysis. Eleven patients had TEP abandonment (26.8%).
- 25 (56.8%) of TEPs were placed primarily.
- Pre-TL radiation therapy ($p = 0.018$), increasing distance from place of residence to the hospital at the time of TL ($p = 0.017$), and homelessness or incarceration at time of TL ($p = 0.043$) were significant predictors of TEP abandonment.**

RESULTS CONTINUED

- State ADI, insurance coverage of laryngectomy supplies, and history of alcohol and/or substance use disorder were not significantly correlated (Table 1).

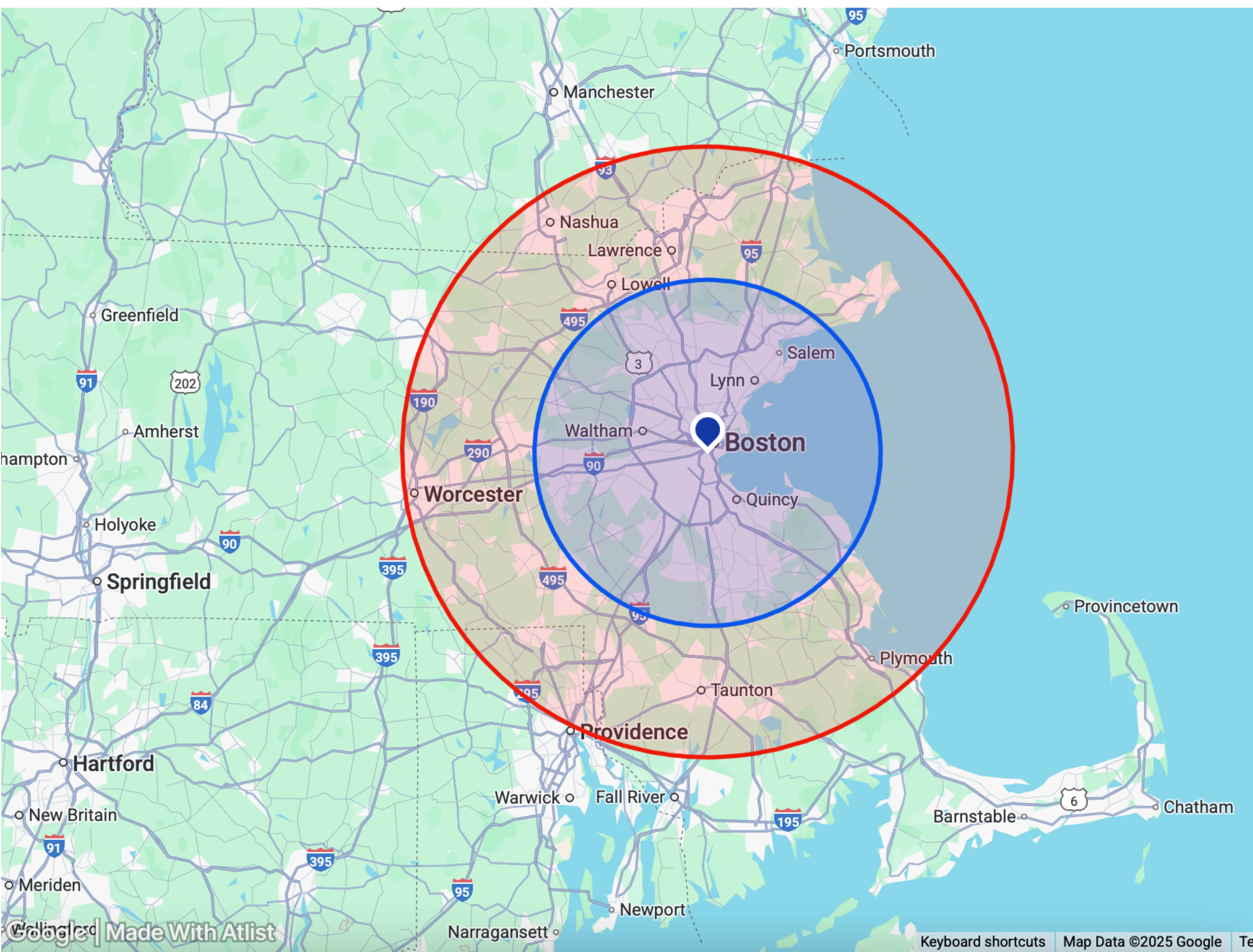
Table 1. Effect of Six Variables on TEP Abandonment

	Abandoned TEP	Retained TEP	Exp (B)	B	S.E.	Sig.
Distance from hospital† (miles)	--	--	0.915	-0.089	0.038	0.017*
ADI - State Decile† (1-10)	--	--	2.107	0.745	0.383	0.052
Radiation Therapy Pre-TL	8/11 (72.7%)	11/30 (36.7%)	774.878	6.653	2.802	0.018*
Laryngectomy Supplies Covered¶	3/11 (27.3%)	3/30 (10.0%)	0.015	-4.216	2.162	0.051
Housing Status of Homeless or Incarcerated†	3/11 (27.3%)	1/30 (3.3%)	282.989	5.645	2.794	0.043*
Alcohol, Substance Use Disorder, or Both	5/11 (45.5%)	18/30 (60.0%)	2.483	0.909	1.243	0.464

Exp (B) represents odds ratio. SE = standard error. Sig. = significance, alpha = 0.05

** statistically significant. † at time of TL. ¶ at time of most recent follow-up.*

Figure 1. Radii of Mean Distance from Hospital



Blue pin: location of Boston Medical Center. Blue circle: radius equal to mean distance of non-abandonment group patient residences from hospital. Red circle: radius equal to mean distance of TEP abandonment group residences from hospital.

RESULTS CONTINUED

Table 2. Comparison of Descriptive Statistics for TEP Abandonment and Retention Groups

Distance between Residence and Hospital (miles)	Abandoned n = 11	Retained n = 30
Mean	38.49	21.70
Median	38.10	6.20
Interquartile Range	61	37

(a) Distance between Residence and Hospital

Metric	Abandoned n = 5	Retained n = 8
Mean Total Gray	64.79	67.58
Range	45 – 70	63 – 70
Mean Fractions	32.20	32.35
Range	25 – 35	28 – 35

(b) Pre-TL Radiation Therapy

DISCUSSION

- Reduced access to pre- and post-operative SLP sessions or delayed management of complications may influence abandonment in patients living further from the hospital.
- Pre-TL radiation may lead to increased burden of care due to a higher frequency of prosthesis changes, which may lead to eventual abandonment.
- Patients who are incarcerated or homeless may lack agency in navigating their post-operative care.
- The disparities highlighted here should inform specialized attention to pre-operative counseling and follow-up care rather than discourage otolaryngologists from considering TEP for patients with certain SDOH.

CONCLUSION

Among alaryngeal speech methods, TEP has the highest success rate in terms of successful voicing, speech quality, and improved quality of life in patients with TL. However, a number of factors make maintenance challenging, and TEP abandonment continues to be a well-documented issue. **We found that increased residential distance to hospital, housing status, and pre-laryngectomy radiation therapy to the neck are significant predictors of TEP abandonment.** The identification of distance and housing status as a barriers to successful voice restoration underscores the need to explore strategies to bridge this gap. The relationship between pre-TL RT to the neck and TEP abandonment warrants further exploration.